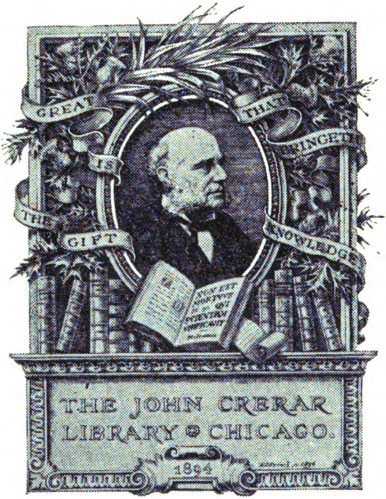
617.15
S 302

FIRST AID
X-RAY ATLAS
OF
FRACTURES
AND
DISLOCATIONS

BY
H. C. ORRIN

PAUL B. HOEBER
67-69 EAST 59TH STREET
NEW YORK
1923

THE
JOHN CRERAR
LIBRARY


GREAT IS THE GIFT THAT BRINGETH KNOWLEDGE
THE JOHN CRERAR LIBRARY CHICAGO.
1894

American Medical Association

acb. 6/14/23

PLEASE RETURN TO
Bureau Health & Public Instruction

X-RAY ATLAS OF
FRACTURES AND DISLOCATIONS
AND THEIR FIRST AID TREATMENT,
INCLUDING AN
ILLUSTRATED DESCRIPTION OF THE SKELETON

FIRST AID X-RAY ATLAS OF FRACTURES AND DISLOCATIONS

INCLUDING ILLUSTRATED DESCRIPTION OF THE SKELETON

BY

H. C. ORRIN
O.B.E., F.R.C.S. (ÉD.)
SURGEON, MINISTRY OF PENSIONS ORTHOPÆDIC HOSPITAL;
LATE CIVIL SURGEON TO THE 3RD LONDON GENERAL HOSPITAL;
EXAMINER IN FIRST AID TO THE INJURED, ETC., ETC.

PAUL B. HOEBER
67-69, EAST FIFTY-NINTH STREET
NEW YORK
1923

PRINTED IN GREAT BRITAIN

INTRODUCTION

Since the introduction of the "First Aid X-Ray Atlas of the Arteries," the author has been approached as to the production of a similar X-ray handbook of First Aid, dealing with Fractures and Dislocations.

It has become the custom in the larger centres where the systematic teaching of First Aid and Ambulance work obtains, to illustrate the lectures by the very free use of X-ray negatives, both for the subjects of anatomy as well as that of the vivid portrayal of the fractures and dislocations which occur in the various regions of the body.

The recognition and treatment of fractures and dislocations form such an essential part of the First Aid and Ambulance training, that any method at our disposal of teaching so difficult a part of the First Aid course, as by the means of X-ray photographs, is to be welcomed.

The attempt has therefore been made to present in this little volume, photographs of the normal bones of the skeleton, together with X-ray pictures of the individual bones when they become the subject of fracture in the human body.

653006

617.15
[illegible]

To make the series of actual photographs and X-ray pictures complete, an additional series of the former have been added in which is shown the correct method of applying the appropriate splints and bandages in each variety of fracture. Such photographs form a unique distinction to the orthodox sketches and diagrams of the usual First-Aid Handbook.

The text consists of a description of the skeleton as a whole and of its individual bones, together with details of each fracture and its appropriate treatment.

H. C. ORRIN.

October, 1922.

CONTENTS

CHAPTER PAGE

I. GENERAL ANATOMY OF THE SKELETON - 1

II. DESCRIPTION OF THE SKULL AND TRUNK - 9

III. THE UPPER AND LOWER LIMBS AND THE JOINTS- 20

IV. FRACTURES AND THEIR FIRST-AID TREATMENT 30

V. FRACTURES OF THE HEAD AND TRUNK - 37

VI. FRACTURES AND DISLOCATIONS OF THE UPPER LIMB - - - - - - 49

VII. FRACTURES AND DISLOCATIONS OF THE LOWER LIMB - - - - - - 67

THE PLATES AND ILLUSTRATIONS

PLATE FIG.

I. 1. THE SKELETON (FRONT VIEW) - 3

II. 2. THE SKELETON (BACK VIEW) - - 7

III. 3. THE VERTEBRAL COLUMN - - 13

IV. 4. THE TRUNK, THORAX, PELVIS AND VERTEBRAL COLUMN - - 17

V. 5. NORMAL SCAPULA (FRONT VIEW) - 21

V. 6. NORMAL SCAPULA (BACK VIEW) - 21

V. 7. BANDAGED FRACTURED SCAPULA - 21

VI. 8. X-RAY OF NORMAL HAND - - 25

VI. 9. X-RAY OF FRACTURE OF PHALANX - 25

VI. 10. CRUSHED HAND ON SPLINT - - 25

VII. 11. X-RAY OF GREENSTICK FRACTURE - 31

VII. 12. X-RAY OF SIMPLE FRACTURE - - 31

VII. 13. X-RAY OF COMMINUTED FRACTURE - 31

VII. 14. X-RAY OF COMPOUND COMMINUTED FRACTURE - - - - 31

VIII. 15. THE SKULL (SIDE VIEW) - - 39

PLATE	FIG.		PAGE
VIII.	16.	THE SKULL (FRONT VIEW) - -	39
VIII.	17.	BANDAGE FOR FRACTURED JAW -	39
IX.	18.	NORMAL RIBS (SIDE VIEW) - -	43
IX.	19.	X-RAY OF FRACTURED RIBS - -	43
IX.	20.	FRACTURED RIBS BANDAGED - -	43
X.	21.	NORMAL CLAVICLE - - -	47
X.	22.	X-RAY OF FRACTURED CLAVICLE -	47
X.	23.	FRACTURED CLAVICLE BANDAGED -	47
XI.	24.	NORMAL HUMERUS - - -	51
XI.	25.	X-RAY OF FRACTURED HUMERUS -	51
XI.	26.	FRACTURED HUMERUS IN SPLINTS -	51
XII.	27.	NORMAL ULNA AND RADIUS - -	55
XII.	28.	CROSSED POSITION OF ULNA AND RADIUS	55
XII.	29.	X-RAY OF FRACTURED ULNA AND RADIUS	55
XII.	30.	FRACTURED RADIUS IN SPLINTS -	55
XIII.	31.	NORMAL SHOULDER JOINT - -	60
XIII.	32.	X-RAY OF DISLOCATED SHOULDER -	60
XIV.	33.	X-RAY OF NORMAL ELBOW JOINT -	61
XIV.	34.	X-RAY OF DISLOCATED ELBOW JOINT -	61
XV.	35.	NORMAL FEMUR - - -	65
XV.	36.	X-RAY OF FRACTURED FEMUR - -	65
XV.	37.	FRACTURED FEMUR IN SPLINTS -	65
XVI.	38.	X-RAY OF NORMAL PATELLA - -	69
XVI.	39.	X-RAY OF FRACTURED PATELLA -	69
XVI.	40.	FRACTURED PATELLA IN SPLINTS -	69
XVII.	41.	NORMAL TIBIA AND FIBULA - -	73
XVII.	42.	X-RAY OF FRACTURED TIBIA - -	73
XVII.	43.	FRACTURED TIBIA IN SPLINTS - -	73
XVIII.	44.	NORMAL HIP BONE - - -	77
XVIII.	45.	X-RAY OF HIP JOINT - - -	77
XVIII.	46.	X-RAY OF DISLOCATION OF HIP -	77

FIRST AID X-RAY ATLAS OF FRACTURES AND DISLOCATIONS

CHAPTER I

GENERAL ANATOMY OF THE SKELETON

The human body is built upon a bony framework, commonly known as the skeleton. The individual bones of the skeleton comprise the osseous or bony system.

The Skeleton serves the following purposes:

(1) It provides a strong framework for the body.

(2) It affords attachment for the muscular system.

(3) It protects important internal organs, such as are situated in the Abdomen, Chest, and Skull.

The skeleton is conveniently divided into the following regions or parts:

(1) **The Head.** This embraces the skull—the upper part of which is known as the *Cranium*—and the lower part, *the face*.

(2) **The Trunk,** consisting of the *spinal column*, or backbone; the *thorax*, or chest; and the bony part of the abdomen, known as the *pelvis*.

(3) **The Extremities.** There are two sets—upper and lower. *The upper* consists of the shoulder, arm, and hand bones; *the lower*, the thigh, leg, and bones of the foot.

The Classification of Bones

The bones of the human skeleton are divided into four groups:

(1) *Long Bones.* This class of bones is found in those of the extremities—*i.e.*, Humerus, Ulna, Radius, Femur, Tibia, and Fibula (Plate I).

(2) *Short Bones*, such as those of the wrist, hand, and foot (Plate I).

(3) *Flat Bones.* These are found in the bones of the head, the scapula, or shoulder blade, and the sternum (Plates I and II).

(4) *Irregular Bones*, as are found in the *os innominatum* of the pelvic bones, and those of the vertebræ (Plate IV).

A long bone consists of a central portion—the shaft—which widens out or is enlarged at either end to form its *upper and lower extremities* (Plate XV, Fig. 35).

A short bone consists of a short shaft and two small extremities: (1) The *head*, and (2) the *base*.

PLATE I

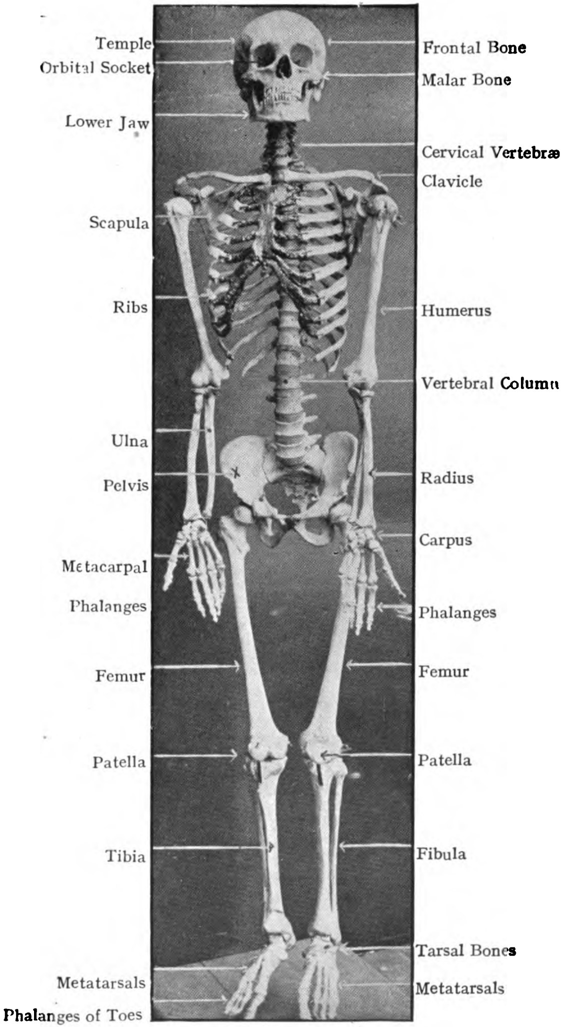


FIG. 1.—THE SKELETON (FRONT VIEW)

Explanation of Terms

To the student of First Aid who has to face the subject of elementary anatomy for the first time, a word or two as to the origin of the names which are used in anatomy may not be out of place. The names given to the individual bones of the osseous system and to the various structures of the human body appear at first sight very confusing and of considerable difficulty. Yet these names and terms are not hurled indiscriminately at these bones and structures. They owe their origin to equivalent words of either Latin or Greek. Each name or term has therefore a definite meaning, expressing in that meaning a resemblance to an object from which it takes its name. For example, the collar bone, or *Clavicle*, as it is called, is a word or term derived from a Latin word *clavis*, which means a key; and true enough, for when a clavicle is examined (see Plate X, Fig. 21) it will be found to resemble the key which was in common use in the time of the Romans.

Again, the long bone in the upper part of the leg is known as the *Femur*, and is so called because its Latin equivalent means "*the thigh*," the femur being the long bone of the thigh.

At the lower end of the spinal column, or backbone, is a large hollow mass which resembles a basin without a bottom. To that part of the skeleton is given the name the "*Pelvis*," nor is the term surprising when we realize that the Latin word *pelvis* means *a basin*. Its resemblance to a basin is well seen in Plate IV.

One further example may be of use in clearing up a difficult term. The pelvis, spoken of above, is made up of two halves, a right half and a left half—the right and left haunch or hip bone. The anatomical term for haunch bone is the "*Os Innominatum*." Why is it so called? Because, owing to the extraordinary shape of this bone, its irregularities and its various twists (see Plate XVIII, Fig. 44), no object could be found to resemble it or from which a name could be borrowed or derived. Hence a name was coined or made up from certain Latin words to indicate this particular bone. Thus, "*Os Innominatum*" means *Os*, a bone; *Innominatum*, without a name; therefore it is really a bone without a name, because nothing resembles it and to which it could give its name.

PLATE II

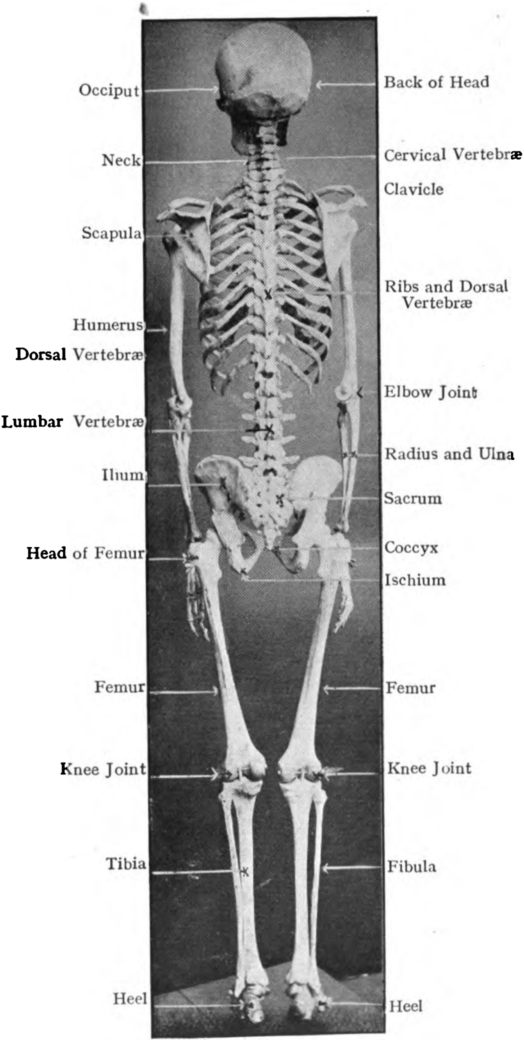


FIG. 2.—THE SKELETON (BACK VIEW)

CHAPTER II

DESCRIPTION OF THE SKULL AND TRUNK

The various regions into which the skeleton has been divided will now be considered in detail.

THE SKULL

The Skull (Plate VII, Fig. 15). The bones of the skull are arranged in two groups: (1) Those above the level of the eyebrows, and known as the *cranium;* and (2) those below that level, known as the face.

The Cranium, which forms a case for the protection of the brain, is made up of the following parts: (1) The front, brow, or forehead, is formed by the *frontal bone;* (2) the crown, vault, or dome, together with the upper part of the sides of the head, is formed by the *right and left parietal bones*. The lower part of the sides of the head is known as the temples—*the temporal bones*. In the temporal bones are the cavities for the organs of hearing.

The back part of the head, where the largest portion of the brain exists, is the widest and deepest part of the cranium. It forms the floor of the skull, and consists of the occipital bone.

The base of the skull is hidden from view by the bones of the face, and also by the upper part of the vertebral column. Numerous apertures exist in the base of the skull for the passage of bloodvessels and nerves. The largest of these openings is known as the *foramen magnum* (which means *large hole* or *opening*). It is through this that the spinal cord passes from the skull to the spinal canal.

The Face consists of:

The Superior Maxilla, or *Upper Jaw*, one on the right, and one on the left side. These two bones are situated between the eye, or orbit, and the mouth, and carry the upper row of teeth.

The Inferior Maxilla forms the lower jaw. In shape it resembles a horse-shoe, and consists of a horizontal and a vertical portion. The point or junction of the meeting of the horizontal and the vertical portions is known as the *angle of the jaw.* The *horizontal portion* carries the sockets for the lower set of teeth. The *vertical portion* ends on either side in a somewhat rounded extremity, known as the *condyle* of the jaw. This condyle forms the joint between the lower jaw and the base of the skull, and is situated immediately in front of the ear.

All the bones of the face, with the exception of the lower jaw, are firmly united together, so that movement between them is impossible. The bones of the cranium and of the face form and give rise to the orbital or eye sockets, and the cavity of the nose. The cavity of the mouth is formed by the upper and lower jaws. The bony roof of the mouth or palate separates the mouth from the nasal cavity above.

THE TRUNK

The Trunk (Plate IV, Fig. 4) is made up of the Spine, Backbone, or Vertebral Column, as it is called, together with the Chest, or Thorax (the ribs), and the Pelvis (Hip Bones).

The Spine, or **Vertebral Column,** is composed of thirty-three bones termed vertebræ. These are placed one upon another like a pile of reels of cotton, to form a bony column. Between each of these vertebræ is placed a thick piece of substance called cartilage or gristle. This serves the purpose of binding the bones to one another, but at the same time allowing a fairly wide range of movement to the column as a whole. The interposed pieces of cartilage also help to break the shock of any sudden force applied to the spine, as, for example, in jumping or falling from a height on to the feet.

The whole of the vertebræ and cartilaginous discs are bound together by strong fibrous bands called ligaments, which embraces its entire length. In shape the vertebral column resembles a pyramid. In its formation it has three distinct curves: (1) The neck, or *Cervical* region, which arches forwards; (2) the *Dorsal*, chest or back region, which arches backwards; (3) the *Lumbar*, or loin region, which arches forwards. These curves give form and ease of movement to the trunk. The average length of the vertebral column is about 28 inches. It supports upon its upper end the skull, and in the region of the back the ribs; whilst at its lower end it rests upon the sacrum. A more detailed description of the various regions of the Vertebral Column are as follows (see Plate III, Fig. 3):

(1) **Cervical** or neck vertebræ are the smallest in size. These are seven in number. The *first* of the cervical vertebræ is called *the atlas*. This forms a joint with the base of the skull, thus enabling the movement of nodding of the head to take place. The *second* cervical vertebra—the *axis*—forms a joint with the atlas, which allows of the side-to-side movements of the head.

(2) **The Dorsal Vertebræ,** twelve in number, are next in size to the cervical. It is to the dorsal vertebræ that the ribs are attached.

(3) **Lumbar Vertebræ,** of which there are five, are the largest in the vertebral column.

The Sacrum, or **rump bone,** consists of the five sacral vertebræ, united in the adult, to form one solid mass. In shape it resembles a wedge, and forms the back part of the pelvis.

PLATE III

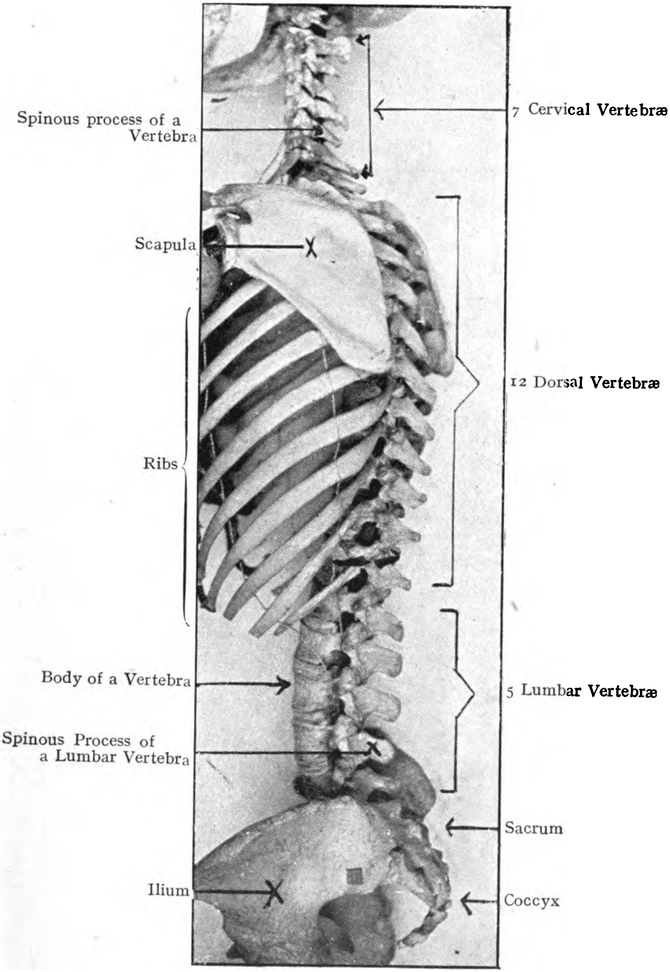


FIG. 3.—THE VERTEBRAL COLUMN (SIDE VIEW).

The Coccyx, or **tail bone,** consists of the last four vertebræ of the backbone, joined together to form a cone-shaped mass. The coccyx thus forms the terminal portion of the spinal column.

Description and Structure of a Vertebra

A typical vertebra consists of (see Plates III and IV):

(1) *A body.* This is a thick solid mass of bone situated in front.

(2) *An irregular bony arch*, formed by the meeting together of small pieces of bone projecting backwards from the body above mentioned. The arches of the vertebræ, when considered together, form a canal for the spinal cord, and hence is known as the spinal canal.

(3) *The transverse processes.* On the outer side of each arch there is a bony projection termed the transverse process. In the dorsal region the transverse processes on each side, serve as a support to the twelve pairs of ribs.

(4) *A spinous process.* Projecting backwards from the middle of the bony arch of each vertebra springs another bony mass, termed the spinous process. These spinous processes can be felt beneath the skin for nearly the whole length of the back.

The Chest, or **Thorax,** is shaped like a cage (Plate IV, Fig. 4). At the back it is formed by the twelve dorsal vertebræ, and on either side by the twelve ribs; whilst in front it has the cartilages or terminal portion of the ribs, together with breast bone, or sternum.

The Ribs consist of twelve pairs of curved bones extending from the dorsal vertebræ behind, and ending in the front of the body at the sternum. The ribs are not composed entirely of bone for the whole of their length. A short distance before the bone ends in front, the bony substance is replaced by cartilage (Plates I and IV).

The twelve pairs of ribs are divided up into three varieties: (1) *True*, (2) *False*, and (3) *Floating*. The upper seven ribs are termed *true* ribs, because they are joined individually and directly to the breast bone by their cartilaginous attachment—the costal cartilage.

Of the lower five ribs, three are termed *false*, and the remaining two are "*floating*." The three false, are so called, because they are first connected with each other by the cartilage which ultimately unites them to the sternum. The eleventh and twelfth ribs are floating because their ends are free in front, and are not connected with the sternum either directly or indirectly.

The Sternum, or **Breast Bone.** This bone forms the front of the thorax. In shape it resembles a dagger. It is a flat bone with an enlargement at its upper end, whilst its lower is more or less pointed, and lies over the pit of the stomach (Plate IV, Fig. 4).

PLATE IV

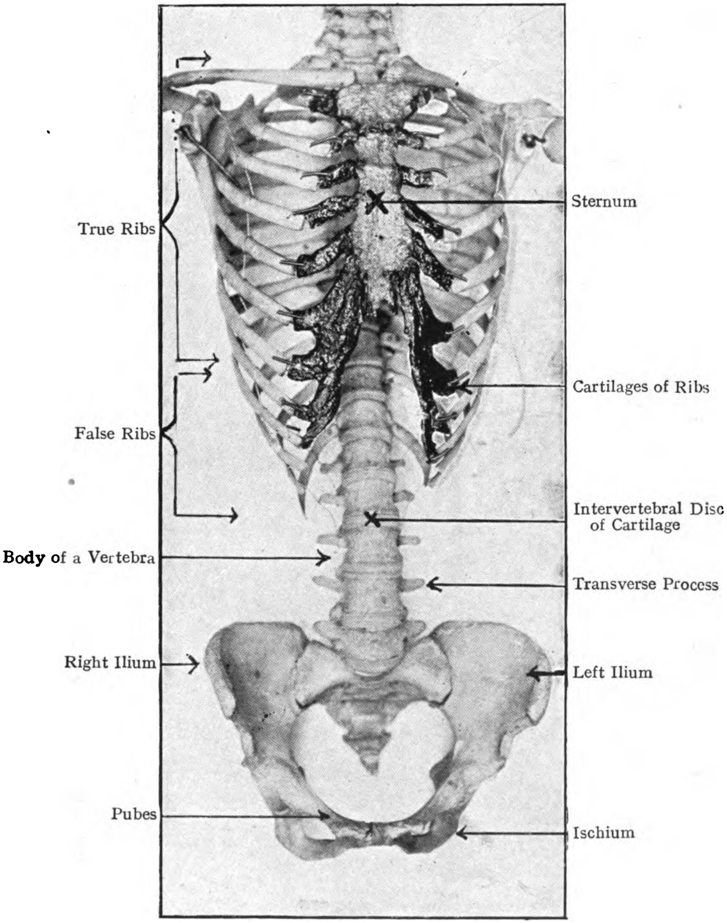


FIG. 4.—THE TRUNK, PELVIS, AND VERTEBRAL COLUMN.

The Pelvis (Plate IV, Fig. 4). The origin of the term "pelvis" has been explained on p. 5. The pelvis is made up of the sacrum and coccyx behind, together with the two *innominate* or haunch bones, one on each side. These two latter meet together in front at the pubes, a small piece of cartilage intervening. The pelvis forms part of the abdomen, as well as supporting its contents.

The *os innominatum*, or *hip bone* (Plate XVIII, Fig. 44), has derived its name in the manner described on p. 1. Each os innominatum is a large, flat, irregular-shaped bone. Each is connected with the sacrum behind, but they meet together in front. At the centre of the outer surface of each bone there is a deep, cup-shaped depression, termed the acetabulum (= a cup or socket), into which fits the head of the femur, and thus forming the hip joint (see Plates I and XVIII).

Each os innominatum is really made up of three separate parts, but which in early adult life become united into one solid mass. These three parts are as follows: (1) The *Ilium*, the upper expanded and flattened portion which gives support to the flanks; (2) the *Ischium*, the strong thickened portion upon which the body rests when in the sitting posture; (3) the *Pubes*, being the portion in front where the two bones meet.

The Sacrum and Coccyx, the other bones which form the back part of the pelvis, have already been described (see Vertebral Column, Plate III, Fig. 3).

CHAPTER III

THE UPPER LIMB AND THE JOINTS

The bones of the upper extremity or limb consists of: (1) The *scapula*, or blade bone; (2) the *Clavicle*, or collar bone; (3) the *Humerus;* (4) the *Radius;* (5) the *Ulna;* and (6) the bones of the *wrist* and *hand*.

The Scapula is a flat triangular bone situated at the upper and back part of the chest, and having its base above, whilst its apex is below. At the upper and outer part of the scapula there is a shallow depression—the glenoid cavity—into which fits the head of the humerus to form the shoulder joint (Plate V, Figs. 5 and 6, and Plate XIII, Fig. 31). The scapula also forms a joint with the clavicle.

The Clavicle, or **Collar Bone** (Plate X, Fig. 21). This bone has already been described, and is in resemblance like that of an old Roman key. It is placed in an horizontal direction at the upper part of the chest above the first rib, where it can be felt beneath the skin, its inner end resting upon the upper part of the sternum, or breast bone, whilst its outer end joins the scapula at the shoulder joint.

The Humerus (Plate XI, Fig. 24). This is the only bone of the upper arm, and is situated between the

PLATE V

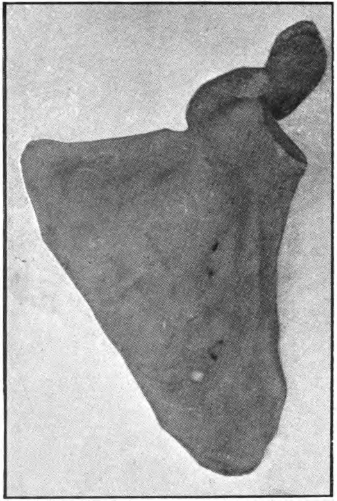


Fig. 5.—Scapula (Front View) showing Socket of Shoulder Joint.

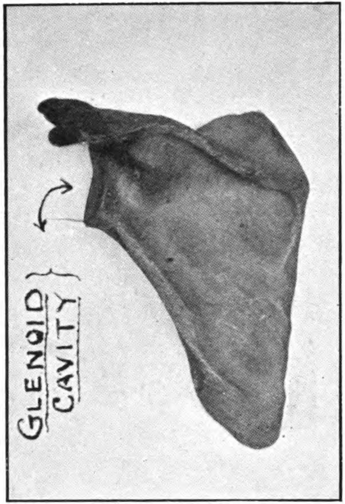


Fig. 6.—Scapula (Back View) showing Socket of Shoulder Joint (Glenoid Cavity).

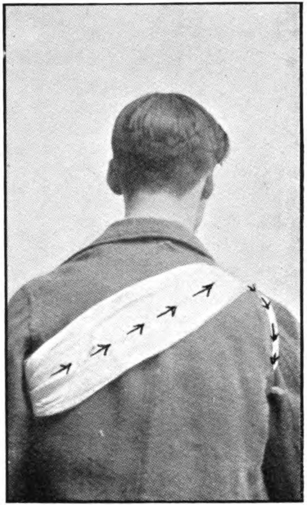


Fig. 7.—Bandage for Fracture of Scapula.

shoulder and the elbow. It is the largest and longest bone of the upper extremity. It consists of a shaft and an upper and lower expanded extremity or end. The upper end has a somewhat large rounded extremity, which fits into the glenoid cavity of the scapula to form the shoulder joint. The lower end of the humerus forms, with the radius and ulna, the elbow joint.

The Forearm consists of two long bones, the Radius and Ulna, placed side by side, and situated between the elbow and wrist. These two bones lie parallel with one another when the forearm is placed with the wrist and back of the hand on the table. They cross over each other when the wrist is turned so that the palm of the hand is placed downwards on the table (Plate XII, Figs. 27 and 28).

The Radius is situated on the outer or thumb side of the forearm.

The Ulna, the second of the two long bones of the forearm, is placed on the inner or little finger side.

Both these bones of the forearm reach from the elbow to the wrist.

The Wrist and **Hand** (Plate VI, Fig. 8). (1) *The Wrist*, or Carpus, as it is termed, consists of eight small bones, known as the carpal bones, which are arranged in two rows, four in each—an upper and a lower. (2) *The Hand* may be said to be divided into the palm and the fingers. The palm is made up of the five metacarpal bones which form its framework. The metacarpals are placed between the lower row of the carpus and the bones of the fingers.

The Finger Bones, or Phalanges, consist of three small bones in each finger, with two only in the thumb (Plate VI, Fig. 8).

THE LOWER EXTREMITY

The Thigh (Plate XV, Fig. 35). The longest bone of the human body is found in the thigh, and is known as the *Femur*. It is the strongest as well as the longest bone, and reaches from the hip to the knee. It is the best example of the long bones, consisting, as it does, of a shaft and two extremities or ends—an upper and a lower. The shaft is thick, rounded, and arched forward. The upper end or extremity has a rounded head attached to a short process of bone which projects inwards, and known as the neck. It is the head of the femur which fits into the socket, or acetabulum, of the hip bone to form the hip joint (Plate XVIII. Figs. 44 and 45).

The Patella, or **Knee Cap.** This bone is triangular in shape. It lies in front of the knee joint immediately beneath the skin. It is so placed that the base of this bone is upwards, and its apex or blunt-pointed end downwards (Plate XVI, Fig. 38).

PLATE VI

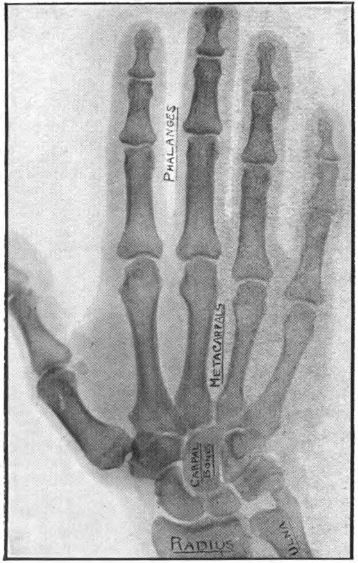


FIG. 8.—X-RAY OF NORMAL HAND.

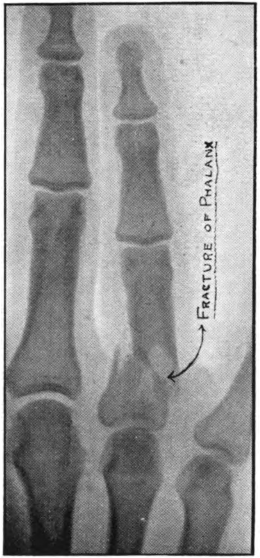


FIG. 9.—X-RAY OF FRACTURE OF PHALANX.

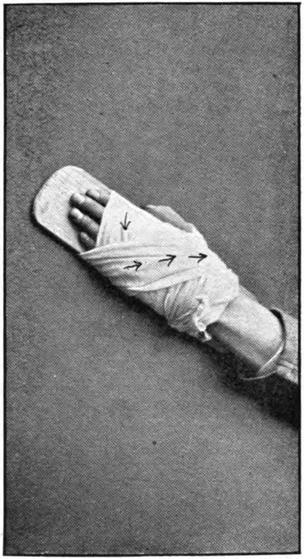


FIG. 10.—BANDAGE AND SPLINT FOR CRUSHED HAND.

The Leg consists of two bones: (1) The *Tibia*, or shin bone; and (2) the *Fibula*, or brooch bone. These bones are placed side by side.

The Tibia (Plate XVII, Fig. 41) lies in front of the leg, and is the inner of the two bones. It is the next longest bone to the femur, and extends from the knee to the ankle, in both of which joints it forms an important part. The sharp edge or margin of the tibia can be felt immediately beneath the skin of the front of the leg. This is commonly known as the shin.

The Fibula (Plate XVII, Fig. 41), brooch or splint bone, as it is sometimes called, is placed on the outer side of the tibia. The lower end of the fibula forms the outer part of the ankle joint.

The Foot and Ankle. The bones which enter into the formation of these are the *tarsus*, or ankle, the *metatarsus*, or sole, and the *phalanges*, or toes (Plates I and II).

The Tarsus, or tarsal bones, consists of a group of seven small irregular bones which, united together, form the instep. The largest of the tarsal bones forms the heel. The uppermost is the ankle bone, and forms the lower part of the ankle joint.

The Metatarsal are the five short bones which form the fore part of the sole of the foot. They are situated between the tarsus and the phalanges of the toes.

The Phalanges, or Toe Bones, are fourteen in number, two in the big toe and three in each of the others.

THE JOINTS

A Joint, *or articulation,* is formed at the point or junction where two or more bones come in contact. In such joints as the hip, knee, elbow, etc., where a fairly wide range of movement takes place, the surfaces of the bones are covered by a thin layer of cartilage or gristle. This lessens friction and shock. The ends of the bones which form the joint are enclosed in a bag or sac, termed a *capsule,* which entirely surrounds the joint. To prevent friction occurring when the joint movements take place, the interior of the capsule, which is lined with synovial membrane, secretes a lubricating fluid—the synovial fluid. This makes the movements of the joint easy.

The two main varieties of joints are:

(1) *The ball-and-socket joint,* such as is found at the shoulder or hip. The shoulder joint consists of a shallow socket or saucer-like depression in the outer angle of the scapula, or shoulder blade, into which articulates the head of the humerus (Plate XIII, Fig. 31). It is the shallowness of the socket of the shoulder joint which renders the head of the humerus liable to

being easily put out, or *dislocated*, as it is termed (Plate XIII, Fig. 32).

(2) *The hinge joint*, of which the elbow is an example (Plate XIV, Figs. 33 and 34), is formed by two or more bones where a to-and-fro movement is desired. Thus the ankle joint is formed by the tibia and fibula above and the ankle bone below.

CHAPTER IV

FRACTURES AND THEIR TREATMENT

When a bone breaks it is said to have *fractured*. A fracture may therefore be spoken of as a broken bone:

Causes of Fracture. A fracture may result from: (1) *Direct violence*. By this is really meant that, as a result of a severe blow (the impact of a bullet, the passage of a wheel), a bone breaks at the spot or seat where this direct force is applied.

(2) *Indirect violence*. A fracture is produced by indirect violence when a bone breaks as a result of the force being applied at some distance from the actual seat of injury. In other words, there is a transmission of the force applied. For example, a fall on the outstretched *hand* may result in a *fracture of the radius* at *the wrist*, or of the *collar bone*. Or, again, a fall upon the *feet* from a height may produce a *fracture of the base of the skull*.

(3) *Muscular Action*. Certain bones are liable to be broken by a sudden and violent contraction of the muscles attached to them. An example of such muscular action is seen in fracture of the patella (Plate XVI, Fig. 39).

PLATE VII

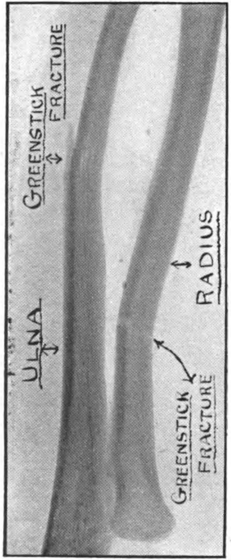


FIG. 11.—GREENSTICK FRACTURE.

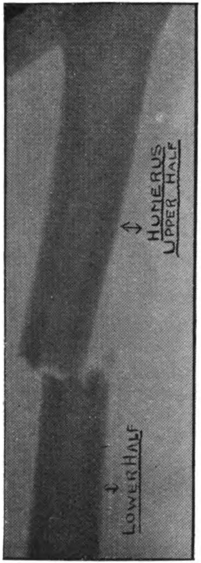


FIG. 12.—SIMPLE FRACTURE.

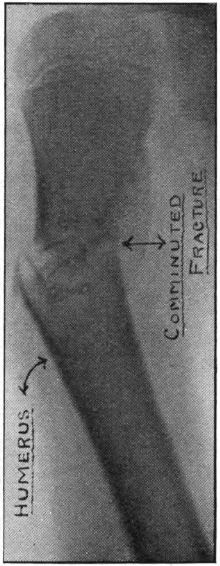


FIG. 13.—COMMINUTED FRACTURE.

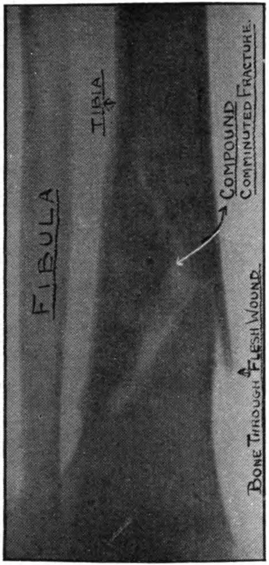


FIG. 14.—COMPOUND COMMINUTED FRACTURE.

Varieties of Fractures

Fractures are divided into classes according to the amount of damage to the surrounding tissues.

(1) **Simple.** Where there is merely a breaking of the bone, the surrounding parts being but slightly injured, if at all (Plate VII, Fig. 12).

(2) **Compound** (Plate VII, Fig. 14). In such fractures the bone is broken, and the skin and tissues are so torn as to permit direct or indirect communication between the exterior and the seat of fracture. The fractured ends may protrude through the skin or the external wound may lead down to the broken bone.

(3) **Complicated.** In a complicated fracture not only is the bone broken, but there is, in addition, an injury to important structures in the surrounding parts, such as bloodvessels or nerves, damage to the brain or spinal cord, the lungs, or the bladder.

(4) **Comminuted** (Plate VII, Fig. 13). Here the bone is broken into several pieces at the seat of injury.

(5) **Greenstick.** This form of *incomplete* fracture is met with in children, owing to the fact that the bones are softer than those of adults; the bone bends and cracks without completely breaking across (Plate VII, Fig. 11).

(6) **Impacted.** Here the bone is broken, and the ends are driven or wedged the one into the other.

General Signs and Symptoms of Fracture

These are as follows:

(1) **Pain** at or near the seat of injury.

(2) **Swelling** around the seat of fracture. It should be borne in mind that the presence of swelling frequently renders it difficult to observe the other signs of fracture.

(3) **Deformity** of the limb at the seat of fracture. Here the limb assumes an unnatural position, as well as an unnatural shape at the seat of fracture.

(4) **Loss of power** in the limb.

(5) **Shortening** of the limb. This is brought about by the contraction of the surrounding muscles, causing the broken ends of the bone to override or overlap.

(6) **Crepitus,** or bony grating. This sensation is produced—felt and sometimes heard—when the broken ends of the bone are made to move against or one upon the other.

(7) **Unnatural Mobility.** Movement may be made out at the seat of fracture, where none normally should exist.

(8) **Irregularity of the Bone.** If the bone is close to the skin the fracture may be felt, or even seen, if the fracture is compound.

Treatment of Fractures

General Principles. It should be remembered that in the immediate first-aid treatment of a fracture its object is the *prevention of further injury*. To achieve this end the following measures are adopted:

(1) Attend to the fracture on the spot where the injury has occurred. No attempt should be made to move the patient until the application of splints will have rendered the limb as immovable as possible. In this way a simple fracture is prevented from becoming a compound or complicated one.

(2) Steady and support the injured limb.

(3) Straighten the limb with great care. Where shortening has occurred, the limb should be steadied by grasping it above and below the seat of the fracture, then pull upon the foot (in the case of the lower leg) to restore the limb as far as possible to its natural position and length.

(4) When the above has been achieved, fix the limb in this position by means of splints and bandages.

(5) Hæmorrhage accompanying a fracture must be attended to first.

(6) Patients with fractures of the spine, pelvis, or thigh and leg, must not be removed except in the lying position on a stretcher.

(7) To lessen the effects of shock which results from

such an accident as a fracture, it is necessary to keep the patient warm.

(8) In all injury where a doubt arises as to the existence or not of a fracture *always treat as a fracture.*

Fractures of the individual bones, together with the appropriate treatment, will be detailed in their respective anatomical regions.

CHAPTER V

FRACTURES OF HEAD AND TRUNK

Fractures of the Skull.

Fractures in this region are divided into those of the *upper part*, or *cranium*, and those of the *lower part*, or *base*.

Fracture of the Cranium.—*Cause.* This form of fracture is usually the result of direct violence, as from a blow on the head.

Signs. There is either immediate or gradual approaching insensibility. The broken bone or irregularity of bone at the seat of injury may be felt. Considerable swelling is usually present.

Fracture of the base is usually brought about by indirect violence, as a fall from a height upon the feet or on the head.

Signs. Insensibility coming on immediately, with, as a rule, blood or clear fluid flowing from the canal of the ear; and blood from the mouth or nose. Sometimes the blood from the mouth is swallowed; to be afterwards vomited; when it assumes a coffee-ground appearance.

If the fracture should have extended into the orbit, the white area of one or both eyes may appear bloodshot.

Treatment. (1) The urgent call for medical assistance is the first essential. (2) Place the patient in the recumbent position, with the head raised. (3) If a scalp wound is present, apply a pad and bandage, avoiding undue pressure. (4) Arrest hæmorrhage if present. (5) Keep the body warm. (6) If insensible, do not give anything by the mouth. (7) Do not give alcoholic stimulants.

In the case of fracture of the base of the skull, in addition to the above, plug the ears and nostrils with cotton-wool.

The patient should be removed, recumbent, on a stretcher, but with the head slightly raised.

Fracture of the Jaw.

This fracture is usually compound.

Cause. Direct violence.

Signs. Pain; deformity; loss of power—inability to speak clearly, and to move the jaw freely; irregularity and unevenness of the teeth; inability to close the mouth; crepitus; and bleeding from the mouth and gums.

Treatment. With the palm of the hand placed below the injured bone, gently press or push the broken ends into their natural position against the upper jaw.

PLATE VIII

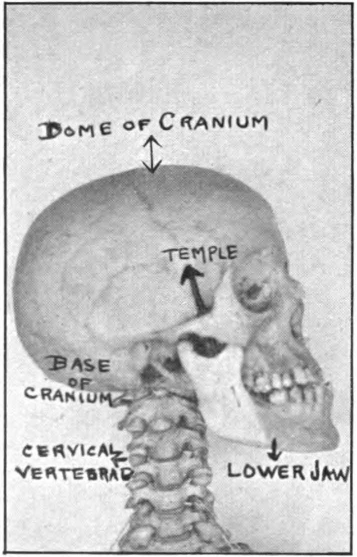


FIG. 15.—THE SKULL (SIDE VIEW).

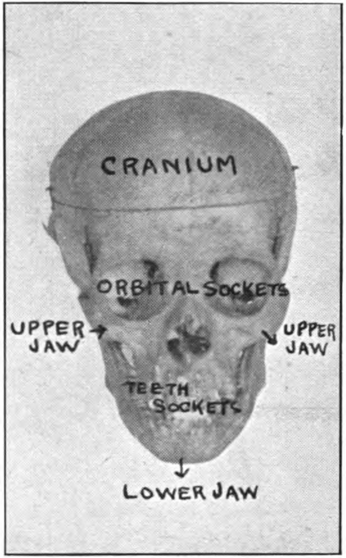


FIG. 16.—THE SKULL (FRONT VIEW).

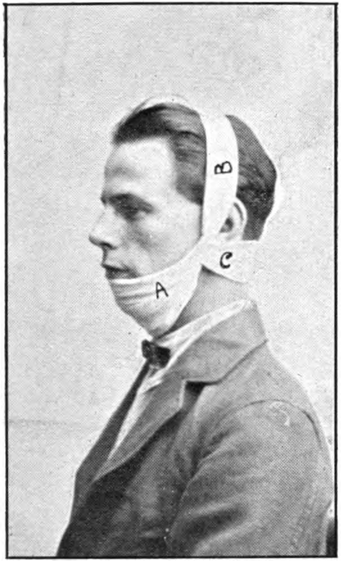


FIG. 17.—BANDAGE FOR FRACTURED JAWS.

Keep the ends in this position by applying the centre of a narrow bandage under the chin, carrying one end over the head, crossing the ends at the angle of the jaw; the long end is then carried across the chin, and the ends tied on the opposite side (Plate VIII, Fig. 17).

Fracture of the Spine

The vertebral column may be broken either by direct or indirect violence.

Direct violence. A fall from a height on to the back across an object such as a beam or bar, or upon an uneven surface.

Indirect violence. A fall upon the head resulting in a broken neck is an example of this form of injury. Fractures of the spine, whether of direct or indirect nature, are usually complicated with injury to the spinal cord and the nerves which it gives off.

Thus a broken back consists of a fracture of one or more vertebræ, with displacement of the fragments; with the result that the spinal cord is compressed or torn, thereby causing partial or complete paralysis of all the parts below the seat of fracture. Pain is present at the seat of injury.

Treatment. (1) Send for medical assistance. (2) Prevent and avoid all movement on the part of the patient. (3) Treat the attendant shock by warmth externally, and warm coffee or beef-tea by the mouth.

Fracture of the Ribs (Plate IX, Fig. 19)

Causes. Fracture of the ribs results from either direct or indirect violence, or may follow violent muscular action, as from coughing or sneezing.

The ribs which are more frequently fractured than the others are the 6th, 7th, 8th, and 9th, the fracture taking place midway between the sternum and the spine.

In fractures by indirect violence the ends of the ribs are usually driven outwards. In those fractures which are caused by direct violence, the ends of the bone are driven inwards, sometimes resulting in injury to the lungs, liver, or spleen.

Signs. Severe pain in the side, of the nature of "stitch," increased on attempting to take a long breath. Breathing is short and shallow; crepitus may be felt when the palm of the hand is placed over the seat of injury, and deep inspiration is attempted by the patient. If the lungs are injured, frothy bright red blood will be coughed up or expectorated. If the liver is torn, internal hæmorrhage results.

Treatment. This will vary according to the nature of the injury, whether simple or complicated by injury to an internal organ and hæmorrhage.

(1) *When the fracture is simple and uncomplicated.* Apply two broad bandages round the chest sufficiently firm to afford support and comfort. The *centre* of the

PLATE IX

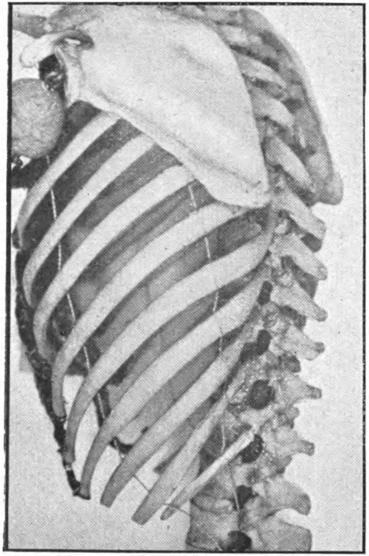


FIG. 18.—NORMAL RIBS (SIDE VIEW).

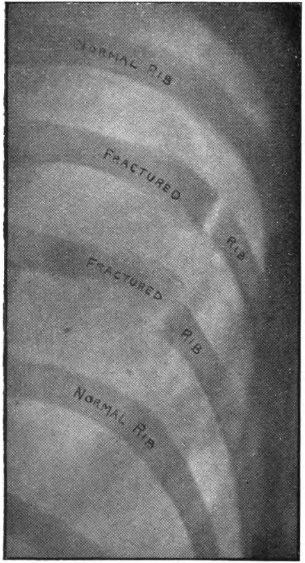


FIG. 19.—X-RAY OF FRACTURED RIBS.

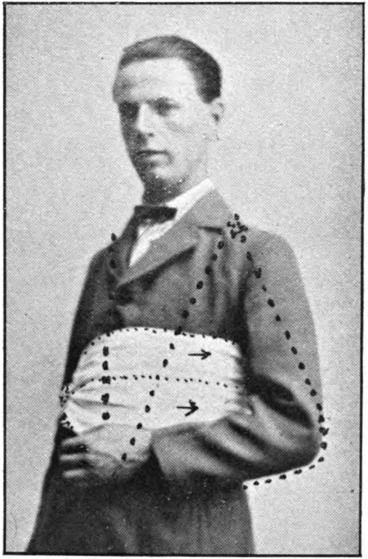


FIG. 20.—FRACTURED RIBS BANDAGED.

first bandage should be immediately *above*, and the centre of the second immediately *below* the fracture. The lower bandage should overlap the upper to half its extent. Tie the knots of the bandages on the opposite side of the chest somewhat towards the front of the body.

The arm on the injured side of the body should be placed in a large sling (Plate IX, Fig. 20).

(2) *When the fracture is complicated by internal injury.* Do not apply supporting bandages round the chest. Lay the patient down, inclined slightly to the injured side. Loosen the clothing; give ice to suck, and place an ice-bag over the seat of injury. Treat along the lines as for internal hæmorrhage. Place the arm on the injured side in a large arm sling.

Fracture of the Sternum (Breast Bone)

Cause. Fracture of the breast bone may be the result of direct or indirect violence, or from muscular action.

Signs. Pain, tenderness, and swelling at place of fracture are usually present. The pain is increased by deep breathing or on coughing. The fracture may be felt beneath the skin.

Treatment. Treat on the lines as for fractured ribs, keeping the patient quiet and in an easy position until the arrival of the doctor.

Fracture of the Pelvis

Cause. Direct violence. Fracture of the pelvis is very often complicated with injury to the bladder and large bloodvessels in the neighbourhood.

Signs. The patient is unable to stand, although there is no sign of damage to the lower limbs. There is severe pain in the pelvis; symptoms of shock of a more or less severe nature. On passing urine, blood may be present with it if the bladder is injured.

Treatment. Send for the doctor. Lay the patient in whatever position is found to give the greatest ease. According to the desires of the patient, the limbs may be drawn up or straightened out, whichever produces the greatest ease.

Apply a broad triangular bandage round the hips tight enough to support the parts, but not too tight as to press the broken bone inwards.

Two long splints, reaching from armpits to just beyond the feet, should be applied, one on each side of the body. Tie these in position by means of triangular bandages folded narrow, similar to that for fractured thigh (Plate XV, Fig. 37). Treat any signs of shock which may be present.

PLATE X

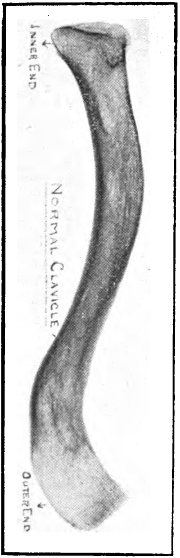


FIG. 21.—NORMAL CLAVICLE.

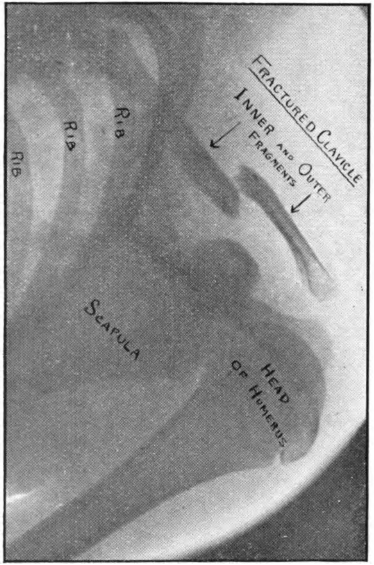


FIG. 22.—X-RAY OF FRACTURED CLAVICLE.

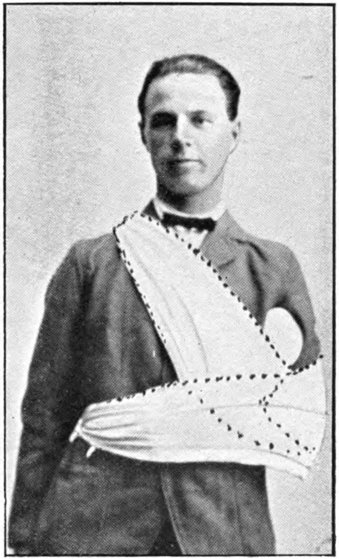


FIG. 23.—FRACTURED CLAVICLE BANDAGED.

CHAPTER VI

FRACTURES AND DISLOCATIONS OF THE UPPER LIMB

Fracture of the Collar Bone (the Clavicle) (Plate X, Fig. 22). A fracture of this bone is usually the result of indirect violence, and frequently caused by a fall on to the outstretched hand or on to the shoulder.

The attitude of the patient is characteristic.

The arm on the injured side is partially helpless, and the patient usually supports it at the elbow with his other hand, inclining his head towards the injured side. There is, in addition to the usual signs of fracture, distortion of the collar bone. The fractured ends can usually be felt to overlap; the outer fragment being the lower. There is also pain and crepitus present.

Treatment. In fracture of the clavicle, aim at correcting the depression of the shoulder; prevent the overlapping of the broken ends; keep the ends of the bone in apposition; and, lastly, lessen the pain by immobilizing the arm. To do this (1) remove the coat; (2) make a pad about 2 inches thick and about the size of a fist, and place it well up into the armpit; (3) place the forearm across the chest, keeping the shoulder back as far as possible, and supporting it in a sling made as follows: Take a triangular bandage unfolded, and lay it across the chest over the injured limb with one end on the uninjured shoulder and the point beyond the elbow on the injured side. Now pass the lower end of the bandage under the injured arm, across the back, and tie the ends somewhat loosely in the hollow in front of the sound shoulder. Lastly, fold the point over the elbow of the affected arm and secure it by one or two pins. Then tightly secure the injured limb to the side by a broad bandage passed round the elbow and trunk so as to leave out the shoulder. Tighten the arm sling (Plate X, Fig. 23).

When both collar bones are broken, keep the shoulders back by narrow bandages tied round each arm close to the shoulder, passed across the back, over the opposite arm, and tied together in front so as to raise and support the forearms.

Fracture of the Scapula (the Shoulder Blade). This occurs as a result of direct violence. There is inability to move the limb, and crepitus can usually be felt.

Treatment. Apply a triangular bandage folded broad, and with the centre in the armpit of the injured side; cross the ends over the uninjured shoulder and tie them under the armpit of that side. Support the limb in a sling (Plate V, Fig. 7).

PLATE XI

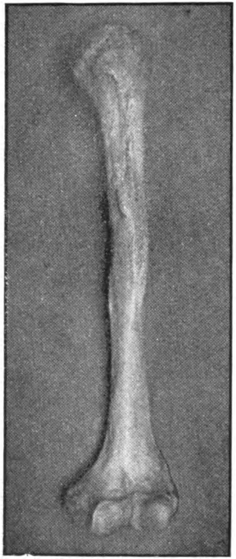


FIG. 24.—NORMAL HUMERUS.

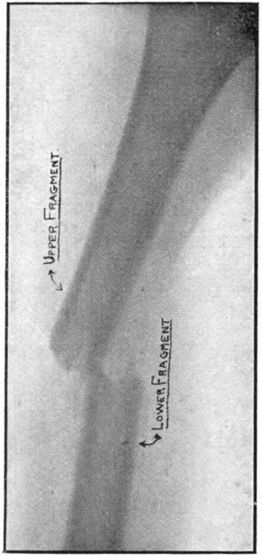


FIG. 25.—X-RAY OF FRACTURED HUMERUS

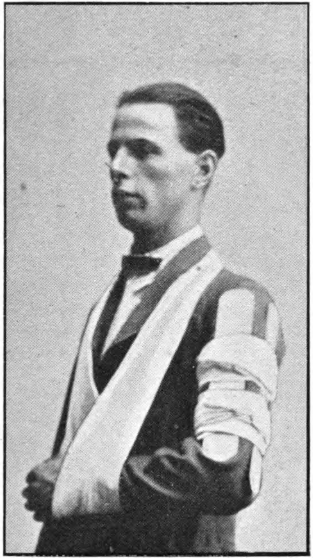


FIG. 26.—FRACTURED HUMERUS IN SPLINTS.

Fracture of the Humerus (Plate XI, Fig. 25). This bone may be broken either close to the shoulder joint, or near the middle of the shaft, or close to the elbow. The fracture is caused by direct violence. All the general signs and symptoms of fracture are present.

Treatment. (1) *When the fracture is near to the shoulder joint.* Apply a broad bandage with its centre above the middle of the arm round the limb and body, tying it on the opposite side.

(2) *When the fracture is near the middle of the shaft.* Bend the forearm to a right angle at the elbow, apply splints reaching from the shoulder to the elbow on the outer and inner sides of the arm, and if possible to the front and back also. The front splint must not compress the bloodvessels in the front of the elbow joint. Now secure the splints by bandages above and below the seat of fracture, and support the forearm by a small arm sling (Plate XI, Fig. 26).

Fractures about the Elbow Joint are caused by direct violence. There is inability to bend the elbow; together with the usual signs of fracture; but in addition so much swelling.

Treatment. Take two splints, the length of the arm and forearm respectively; tie them together at their ends in the form of a right angle. Bend the forearm, and place it across the chest with the palm of the hand towards the body, and with the thumb upwards. Place a small soft pad in the armpit and a well-padded

L-shaped splint along the inner side of the arm and forearm, and fix it above to the arm and below to the forearm and hand by means of a narrow folded bandage. Finally, place the forearm in a broad arm sling (Plate XI, Fig. 26, and Plate XII, Fig. 30).

Fracture of the Forearm (Radius and Ulna) (Plate XII, Fig. 29). One or both bones may be broken. If the ulna is broken, it is usually near the elbow joint; if the radius, the break usually occurs just above the wrist. Fractures in this region are the result of direct violence.

The general signs and symptoms of fracture are present: pain, loss of power, swelling, irregularity, and deformity.

Treatment. The same treatment is required whether the fracture is of one or both bones.

Bend the forearm to a right angle, and place it with the palm of the hand to the body and the thumb pointing upwards. Apply broad splints on the inner and outer sides from the elbows to the fingers. Apply bandages, embracing both splints, immediately above and below the fracture and round the hand (Plate XII, Fig. 30). Place the forearm in a large arm sling.

Fracture of the Wrist (Colles's Fracture). This form of fracture is a common result of a fall on the hand, and is very often impacted. The usual signs of fracture are present, together with a well-marked

PLATE XII

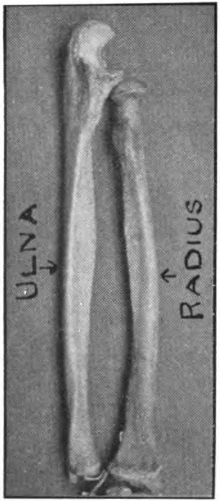


FIG. 27.—NORMAL ULNA AND RADIUS.

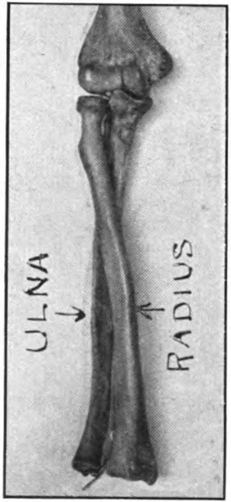


FIG. 28.—ULNA AND RADIUS CROSSED, AS WHEN HAND IS TURNED FACE DOWNWARDS.

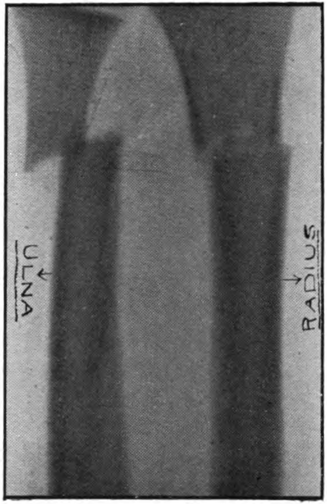


FIG. 29.—X-RAY OF FRACTURE OF ULNA AND RADIUS.

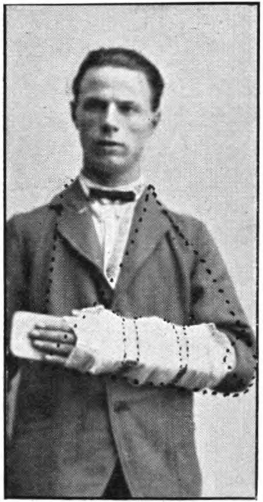


FIG. 30.—FRACTURED RADIUS IN SPLINTS.

deformity at the back of the wrist. The treatment is the same as for a fracture of the forearm (see p. 54).

Crushed Hand—Fracture of the Hand or Fingers (Metacarpals or Phalanges) (Plate VI, Fig. 9). This is caused by direct violence, the usual signs of fracture being present.

Treatment. Apply a carefully padded splint to the palm side of the hand, reaching from well above the wrist to beyond the tips of the finger. Secure the splint by a narrow bandage crossed in the form of a figure of eight (Plate VI, Fig. 10). Apply a large arm sling.

DISLOCATIONS OF THE UPPER LIMB

A Dislocation is the displacement of one or more of the bones at, and of, a joint. It is caused by a fall on to, or some sudden and unnatural movement of, a joint; as by a violent wrench or twist.

The signs and symptoms of dislocation are:

(1) *Pain* of a severe sickening character at or near the joint.

(2) *Loss of movement at the joint.* There is fixity of the joint. The limb cannot be moved at the joint by either the patient or another person. This symptom distinguishes a dislocation from a fracture occurring near the joint.

(3) *Distortion of the joint and deformity of the limb.* The limb assumes an unnatural position, and is misshapen at the joint.

(4) *The end of the displaced bone may be felt under the skin.*

(5) *Swelling around about the joint.*

(6) *Numbness* of the parts below the seat of dislocation.

Treatment. Make no attempt to reduce a dislocation. Put the parts at complete rest to relieve pain. Support the limb in whatever position gives most ease to the patient.

Treat any signs of shock that may be present.

Dislocation of the Shoulder

The normal shoulder joint has been described in the section on Joints (p. 28).

Fig. 31 (Plate XIII), which is an X-ray photograph of a normal shoulder, shows well the head of the humerus in position in the shallow socket—the glenoid cavity—of the scapula.

Fig. 32 (Plate XIII) is an X-ray picture of a dislocated shoulder. It will be seen from this photograph that the head of the humerus is displaced from the glenoid cavity to beneath its lower margin, the glenoid cavity itself being quite empty.

Signs and Symptoms. In addition to the usual signs of dislocation previously mentioned, the normal

PLATE XIII

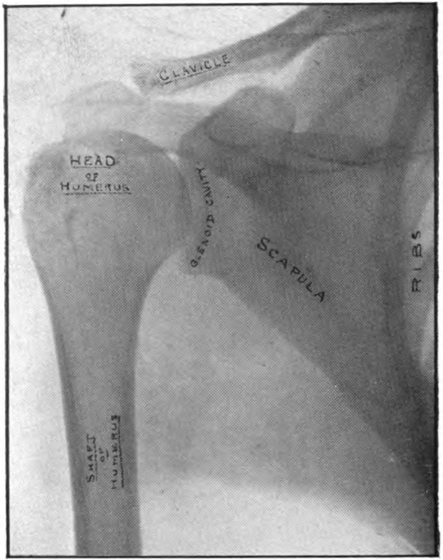


FIG. 31.—X-RAY OF NORMAL SHOULDER JOINT

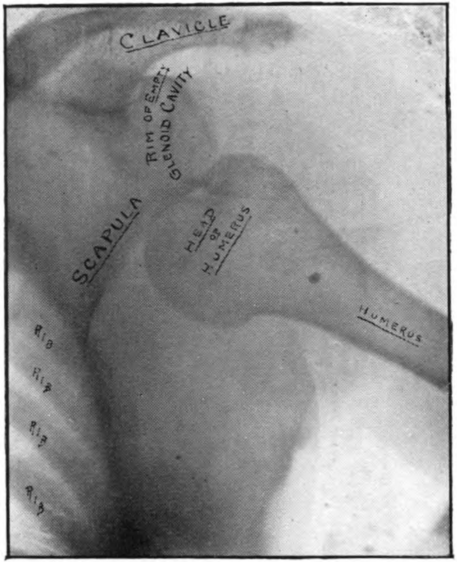


FIG. 32.—X-RAY OF DISLOCATION OF SHOULDER

PLATE XIV

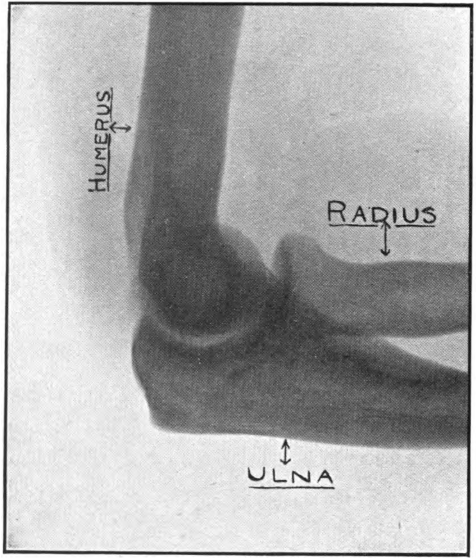


FIG. 33. — X-RAY OF NORMAL ELBOW JOINT (HUMERUS IN POSITION IN SOCKET OF ULNA).

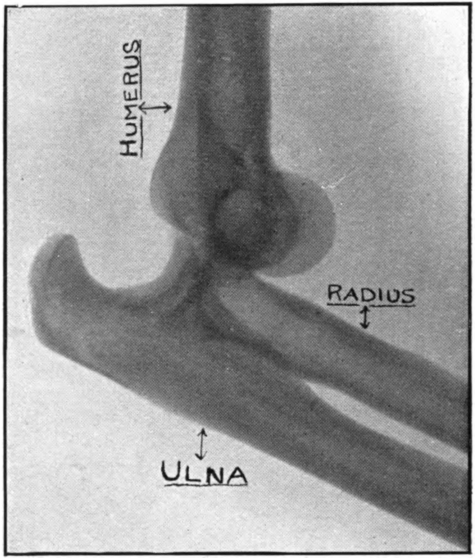


FIG. 34.—X-RAY OF DISLOCATION OF ELBOW (HUMERUS OUT OF SOCKET OF ULNA).

roundness of the shoulder is absent, there being a characteristic hollow or depression instead. This results in the production of the sharp-pointed shoulder so pronounced in this form of dislocation.

The head of the humerus, displaced beneath the lower margin of the glenoid cavity, can be felt under the skin in the centre of the armpit.

The elbow is directed away from the side of the body. There is lengthening of the upper arm and fixation of the joint.

Treatment. The treatment has already been described under the general details of dislocation.

Dislocation of the Elbow Joint

The Elbow Joint (Plate XIV, Fig. 33)—one of the variety of hinge joints—is formed by the lower end of the humerus, together with the upper ends of the ulna and radius. When dislocation occurs at this joint, the lower end of the humerus slips out of the joint and on to the front of the ulna and radius.

When dislocation occurs, it is chiefly in young people. It may be due to either direct or indirect violence.

The usual signs and symptoms of dislocation are present. In addition, the appearance of the arm and elbow is characteristic. The elbow joint is locked and the arm is rendered immobile. The forearm is held in the position of a right angle at the elbow. The displaced bones form a considerable swelling at the

PLEASE RETURN TO
Bureau Health [illegible] Instruction

back of the joint, above which is a marked hollow. The lower end of the humerus projects in front of the joint, the muscles being displaced forwards.

Fig. 34 (Plate XIV) shows a typical example of dislocation of the elbow joint.

Treatment. The treatment is similar to that for fracture of the lower end of the humerus near to the joint. Splints and bandages are applied as shown in the photograph (Plates XI, Fig. 26, and XII, Fig. 30).

PLATE XV

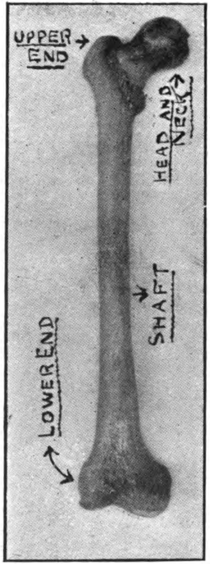


FIG. 35.—NORMAL FEMUR.

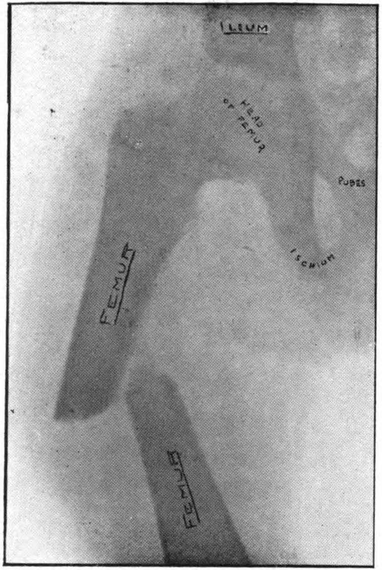


FIG. 36.—X-RAY OF FRACTURED FEMUR

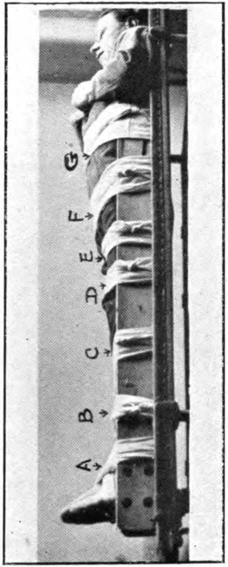


FIG. 37.—FRACTURED FEMUR IN SPLINTS.

CHAPTER VII

FRACTURES AND DISLOCATIONS OF THE LOWER LIMB

Fracture of the Femur, or Thigh Bone (Plate XV, Fig. 36), may take place at its neck; anywhere along the length of the shaft, or close to the knee, and is the result of direct or indirect violence.

There are the usual signs of fracture, together with considerable shortening of the limb and eversion or turning out of the foot, which latter, as a rule, lies on its outer side.

It is to be remembered that a fracture at the neck of the femur is likely to occur in old people, resulting from very slight injury, and is often difficult to distinguish from a severe bruise of the hip.

Treatment (Plate XV, Fig. 37). Steady the limb by holding the ankle and foot. Gently draw down the foot. Bring it into line with the other whilst the limb is grasped above and below the seat of fracture. When the full extension has been procured and the position of the foot corrected, it is thus maintained until the splints are adjusted.

Apply a splint on the outer side from the armpit to beyond the foot. Apply another splint on the inner side from the top or fork of the thigh to the knee. These splints are then secured in position by the application of bandages as follows: Round the chest just above the armpits (G); round the pelvis on a level with the hip joints (F); above and below the fracture round the leg (E and C); round both ankles (B) and feet (A), and tied below the feet; lastly, apply a broad bandage round both knees (D) (see Fig. 37, p. 65).

When the patient is a woman; after extension of the limb, tie the feet together, dispensing with the inner splint; applying the bandages round both limbs.

Fracture of the Knee Cap (Patella). The knee cap may be broken by direct violence, as by falling on the knee; but more frequently it is broken by muscular action as follows: In attempting to prevent a fall, as when the foot slips, the muscles in the front of the thigh act with such force as to snap the knee cap in two (Plate XVI, Fig. 39).

There is pain, loss of power, inability to move the leg or bend the knee; a gap may be felt between the broken fragments of bone (see Fig. 39).

Treatment. Place the patient on his back. Raise and support the head and shoulders. Straighten and raise the limb. Apply a splint along the back of the limb reaching from the buttock to beyond the heel. Apply a narrow bandage with its centre immediately

PLATE XVI

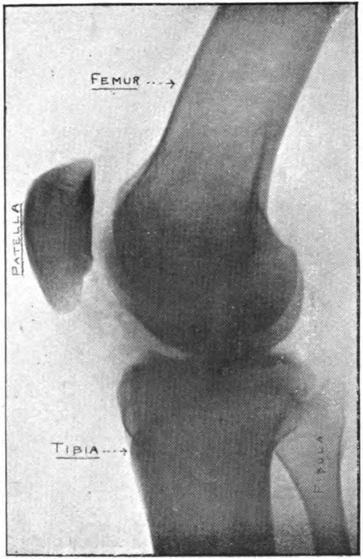


FIG. 38.—X-RAY OF NORMAL PATELLA AND KNEE JOINT

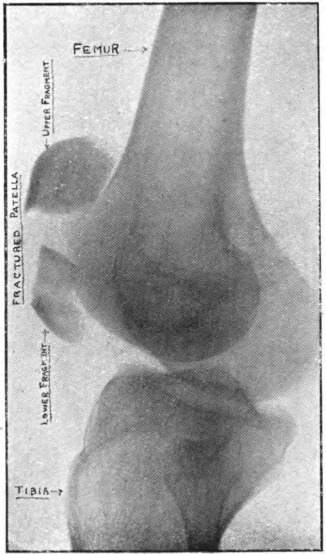


FIG. 39.—X-RAY OF FRACTURED PATELLA.

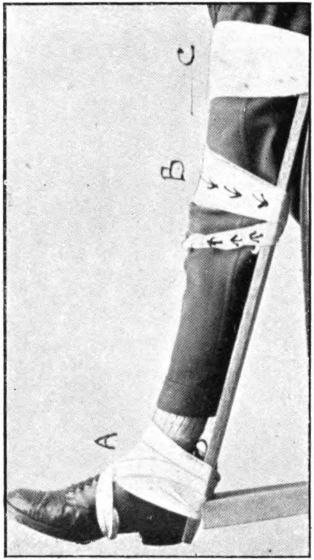


FIG. 40.—FRACTURED PATELLA IN SPLINTS

above the knee cap (B), cross the ends behind over the splint, and tie in front below the broken bone. To secure the splint, still further apply bandages round the thigh (C) and leg (A). Support the foot well off the ground. Apply an ice-bag or a cold-water dressing over the fracture (Plate XVI, Fig. 40).

Fracture of the Leg (Tibia and Fibula) (Plate XVII, Fig. 42). One or both bones may be broken as the result of direct or indirect violence. The usual signs of fracture are present when both bones are broken. When, however, one bone only is broken, deformity is not always noticeable. A fracture of the fibula at its lower end is very often mistaken for a sprain, and sometimes for a dislocation of the ankle.

Treatment. The handling of the limb must be with great care, as a *simple* fracture may easily become a *compound.*

Steady the limb by holding the ankle and foot. Draw the foot into its natural position, and do not release the hold until the splints have been applied.

The splints are placed on the outer and inner sides of the leg, reaching from above the knee to beyond the foot. If only one splint is obtainable, place it on the outer side. Secure the splints by bandages above and below the fracture, immediately above the knee (A and B), round both ankles (D), and, lastly, a broad bandage round both knees (C) (see Plate XVII, Fig. 43).

When the patient is a woman, after extending the limb, tie both feet together, dispensing with the inner splint, and pass the bandages round both limbs.

Fracture of the Bones of the Foot (Tarsus, Metatarsus, or Phalanges). Fractures occurring in either of these regions generally come under the term of a crushed foot.

This accident is usually the result of direct violence, and is commonly caused by the passage of a heavy weight over the foot. The fracture is often compound. The usual signs of fracture are present, and may be recognized by pain, swelling, and loss of power.

Treatment. Remove the boot; apply a well-padded splint to the sole of the foot, reaching from the heel to the toes. Apply a bandage crossed in the figure of eight fashion as for a crushed hand (see Plate VI, Fig. 10). Support the foot in a slightly raised position.

DISLOCATIONS OF THE LOWER LIMB

The definition and description of a dislocation, together with the general principle of treatment, will be found on p. 57.

Dislocation of the Hip

The hip joint is another example of the ball-and-socket variety. It is formed by the head of the femur and the socket (acetabulum) of the hip bone, or

PLATE XVII

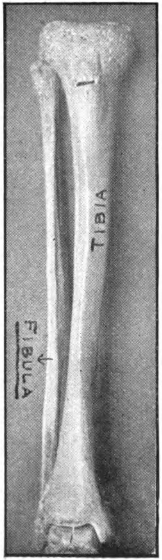


FIG 41. — NORMAL TIBIA AND FIBULA

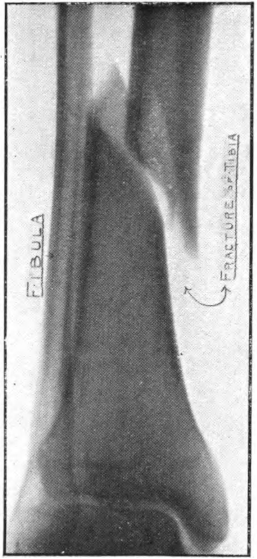


FIG. 42.—X-RAY OF FRACTURED TIBIA.

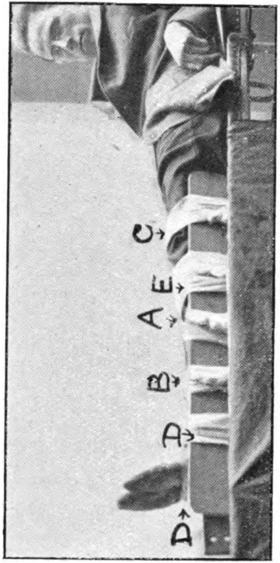


FIG. 43.—FRACTURED TIBIA IN SPLINTS.

os innominatum (see Plate XVIII, Figs. 44 and 45). Fig. 45 is an X-ray photograph of a normal hip joint, where the head of the femur is seen to be well buried in the depths of the acetabulum.

Dislocation of the hip is a very grave condition. It is never produced by direct violence, but always results from a force applied to the feet or knees, as, for example, a fall with the legs widely separated, or when the legs are forcibly drawn apart.

The usual signs and symptoms of fracture are present. The whole leg is drawn up and carried over in the direction of the other leg. In addition, it is turned inwards so that the sole of the foot of the injured limb is placed across the instep of the other foot. The knee is partially flexed and the heel raised.

Fig. 46 (Plate XVIII) is an X-ray photograph of a dislocated hip. In this illustration the head of the femur will be seen out of the socket and lying above the edge of the acetabulum. The acetabulum itself is also seen to be empty.

The treatment is the same as for dislocation of the shoulder (p. 63).

Dislocation of the Ankle Joint

The ankle joint is formed by the lower end of the tibia and fibula, together with the upper end or surface of the first of the tarsal bones (the astragalus) (see Plate I).

Dislocation of the ankle is really a fracture-dislocation occurring at the ankle joint, and results in displacement of the foot in an outward direction. The accident is brought about by the patient slipping on the inside of the foot, as from off a kerbstone. The fibula is broken just above the ankle, and the tip of the lower end of the tibia is torn off, thus allowing the foot to be forced outwards.

Sometimes the accident so occurs as to result in the foot being dislocated inwards.

The signs and symptoms of both a fracture and a dislocation are present.

Treatment. It is best to treat a condition such as this on the lines of a fracture of the tibia and fibula, as has been described on p. 71.

The appropriate splints and bandages are figured on p. 73 (Plate XVII, Fig. 43).

PLATE XVIII

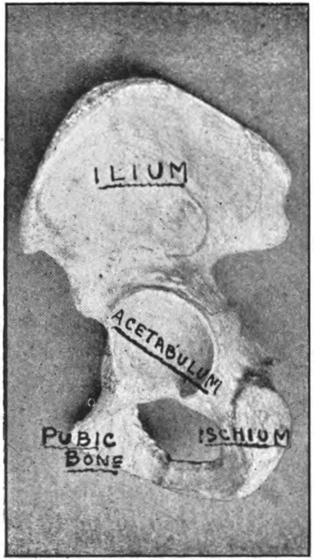


FIG. 44.—NORMAL HIP BONE.

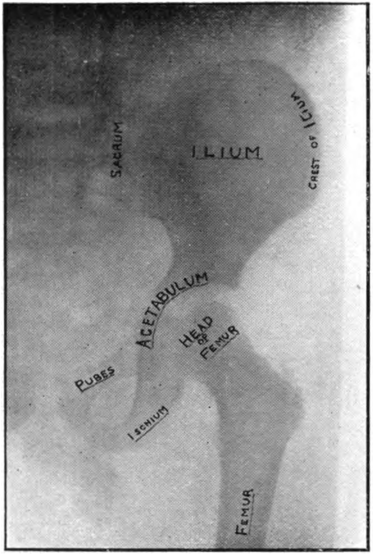


FIG. 45.—X-RAY OF NORMAL HIP JOINT.

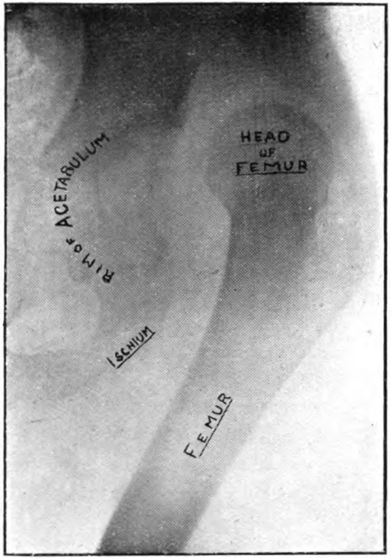


FIG. 46.—X-RAY OF DISLOCATION OF HIP.

INDEX

ACETABULUM, 19
Ankle Joint, 75
Articulations, 28
Ball-and-Socket Joint, 28
Blade Bone, 20
Bones, classification of, 2
Breast Bone, 16
        fracture of, 45
Carpal Bones, 23
Cervical Vertebræ, 12
Chest, description of, 15
Clavicle, 20
Coccyx, 15
Collar Bone, 20
Colles's fracture, 54
Cranium, description of, 9
Crepitus, 34
Crushed Hand, 57
Dislocation of Ankle Joint, 75
    of Elbow Joint, 63
    of Hip, 72
    of Shoulder Joint, 58
Dislocations, description of, 57
    of Lower Limb, 72
    of Upper Limb, 57
Dorsal Vertebræ, 12
Elbow Joint, dislocations of, 63
        fractures of, 53
Extremities, description of, 2
Face, description of, 10
Fibula, 27
Foot and Ankle, 27
Forearm, description of, 23
Fracture of Individual Bones:
    of Clavicle, 49
    of Collar Bone, 49
    of Elbow Joint, 53
    of Femur, 67
    of Fibula, 71
    of Finger, 57
    of Foot, 72
    of Forearm, 54
    of Hand, 57
    of Head (Skull) and Spine, 37
    of Humerus, 53
    of Jaw, 38
    of Knee Cap, 68
    of Metacarpals, 57
    of Patella, 68
    of Pelvis, 46
    of Phalanges, 57
    of Radius, 54
    of Ribs, 42
    of Scapula, 50
    of Shoulder Blade, 50
    of Skull, 37
    of Spine, 41
    of Sternum, 45
    of Tibia, 71
        and Fibula, 71
Fracture of Individual Bones (*continued*):
    of Ulna, 54
    of Upper Limb, 49
    of Wrist, 54
Fractures, and Dislocations of Lower
        Limb, 67
    cause of, 30
    Comminuted, 33
    Complicated, 33
    Compound, 33
    description of, 33
    Impacted, 33
    Signs of, 34
    Simple, 33
    Treatment of, 35
    Upper Limb, 49
    Varieties of, 33
Hand, description of, 23
Head, description of, 1
Hinge Joints, description of, 29
Humerus, 20
Jaw, Lower, 10
    Upper, 10
Joints, description of, 28
Knee Cap, 24
Leg, Bones of, 27
Metacarpals, 24
Metatarsals, 27
Os Innominatum, 19
Patella, 24
Pelvis, description of, 19
Phalanges of Fingers, 24
    of Toes, 28
Radius, 23
Ribs, description of, 16
    fracture of, 42
Sacrum, 12
Scapula, 20
Skeleton, description of, 1
Skull, description of, 9
Spine, 11
Spinous process, 15
Sternum, 16
Tarsus, 27
Terms, explanation of, 5
Thigh, 24
Thorax, 15
Tibia, 27
Transverse process, 15
Trunk, description of, 11
    individual regions, 11
Ulna, 23
Vertebræ, Cervical, 12
    description of, 15
    Dorsal, 12
    Lumbar, 12
    Sacrum, 12
Vertebral Column, description of, 11
Wrist, description of, 23

Printed in Great Britain for Baillière, Tindall and Cox, by
Billing and Sons, Ltd., Guildford and Esher.

Pocket Size. In Cloth Cover. Pp. 48 with 11 Illustrations on 9 Plates.
Price **2s. 6d.** net. Companion Volume to this Book.

FIRST AID X-RAY ATLAS OF THE ARTERIES

By H. C. ORRIN, O.B.E., F.R.C.S. (Ed.)

SPECIMEN PLATE

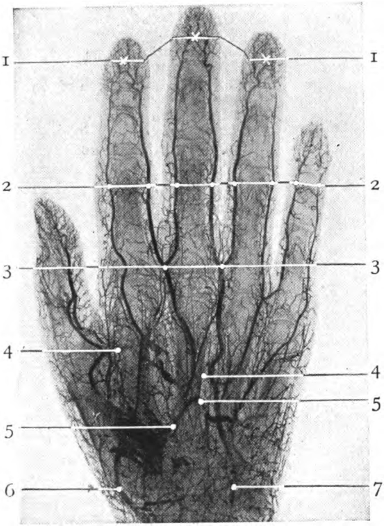


FIG. 2.—THE ARTERIES OF THE HAND.

1. Ends of Digital Arteries at finger tips. 2. Digital Arteries. 3. Division of Digital Arteries at cleft of fingers. 4. Superficial Palmar Arch. 5. Deep Palmar Arch. 6. Radial Artery. 7. Ulnar Artery.

¶ This Atlas of the Arterial System has been produced in response to Lecturers on First Aid.

¶ By means of X-Ray Plates the relationship of the Arteries to the Osseous or Bony System is clearly shown, and the points for the application of pressure for the control and arrest of Hæmorrhage indicated.

¶ Explanatory Text of the Vessels of the various regions of the Body accompanies each plate.

¶ X-Ray Plates of the Heart are also included, and circulation described.

BAILLIÈRE, TINDALL & COX

8 Henrietta Street, Covent Garden, London, W.C. 2

617.15 S302 c.1
First aid Xray atlas of fractures an
087 081 299
UNIVERSITY OF CHICAGO